

## **REMARKS**

In the Office Action, the Examiner objected to drawings, objected to claims 6 and 9; rejected claims 1, 4, 5, 10, and 20 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,441,429 to Hsieh et al. in view of U.S. Patent No. 6,693,321 to Zheng et al.; rejected claims 1-5, 10, 11 and 20 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,153,904 to Yang in view of Zheng et al.;<sup>1</sup> rejected claims 6-8 under 35 U.S.C. § 103(a) as being unpatentable over Yang in view of Zheng et al., and further in view of U.S. Patent Application Publication No. 2004/0033653 of Kim et al.; rejected claim 9 under 35 U.S.C. § 103(a) as being unpatentable over Yang in view of Zheng et al., Kim et al., and U.S. Patent Application Publication No. 2003/0143814 to Bicksler et al.; and rejected claims 1, 4-7, and 9 under 35 U.S.C. § 103(a) as being unpatentable over Bicksler et al. in view of Zheng.

Applicant has amended Figures 7A and 7B; cancelled claims 2 and 11; and amended claims 1, 6, and 20. Claims 1, 3-10, and 12-20 are pending in the above-captioned patent application, of which claims 1, 3-10 and 20 are presented for examination.

Subject to the approval of the Examiner, Applicant proposes to amend Figures 7A and 7B by labeling each figure "Prior Art". These changes are indicated in the drawing Replacement Sheet attached hereto. In light of Applicant's proposed drawing changes, Applicant respectfully requests that the objection to the drawings be withdrawn.

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<sup>1</sup> The text of the Office Action at pages 8 and 9, argues that claims 2 and 11 are unpatentable over Yang in view of Zheng. Accordingly, Applicants assume that the Examiner intended to list these claims with claims 1, 3-5, 10 and 20 in the heading of Section 7 at page 6 of the Office Action.

With respect to the Examiner's objection to claims 6 and 9, the Examiner indicated that "if claim 6 is rewritten to depend on claim 5, claim 9 would have an antecedent basis for 'the second side-wall insulation film'." Office Action at page 3. Applicant has amended claim 6 to depend from claim 5. Accordingly, Applicant respectfully requests the Examiner to reconsider and withdraw the objection to claims 6 and 9.

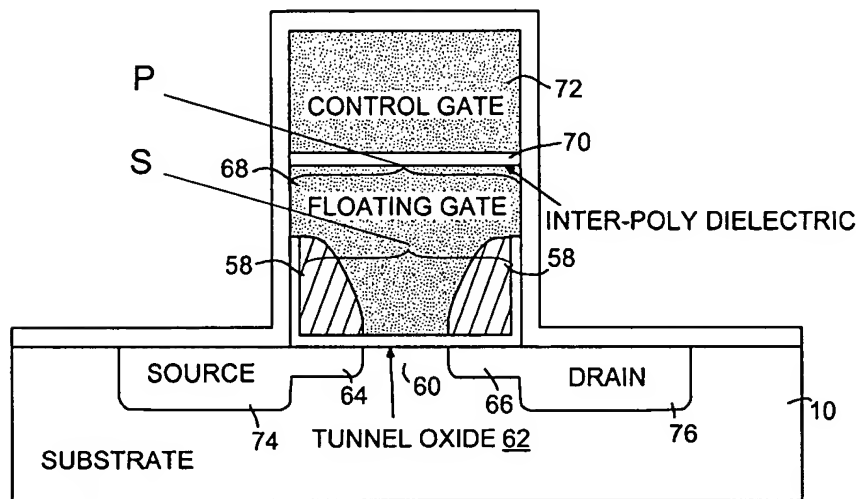
Applicant respectfully traverses the Examiner's rejection of claims 1, 4, 5, 10, and 20 under 35 U.S.C. § 103(a) as being unpatentable over Hsieh et al. in view of Zheng et al.; the rejection of claims 1-5, 10, 11 and 20 under 35 U.S.C. § 103(a) as being unpatentable over Yang in view of Zheng et al.; and the rejection of claims 1, 4-7, and 9 under 35 U.S.C. § 103(a) as being unpatentable over Bicksler et al. in view of Zheng. Amended claim 1, for example, is not obvious over Hsieh et al., Zheng et al., Yang and Bicksler et al. for at least the reason that none of the applied references teaches or suggests the claimed combination "including a width (Q) of the floating gate electrode in the channel length direction is 50 nm or less on a surface of the tunnel insulation film, and a distance (S) between an end portion of one of the gate side-wall insulation films, which end portion is located on a side opposed to the floating gate electrode, and an end portion of the other gate side-wall insulation film, which end portion is located on a side opposed to the floating gate electrode, is 1.3 or more times as great as the width (Q) of the floating gate electrode in the channel length direction," as recited in amended claim 1. Moreover, the applied references also fail to teach or suggest a length of a portion of the floating gate contacting the inter-electrode insulation film having a length (P) such that  $Q < P < S$ , as further required by amended claim 1.

At the outset, Applicant notes that claim 1 has been amended to incorporate subject matter of original claim 2, and claim 2 has been cancelled in order to maintain antecedent basis. The Examiner did not combine Hsieh et al. and Zheng et al., nor did the Examiner combine Bicksler et al. with Zheng et al., in rejecting claim 2. Accordingly, the Examiner apparently concedes that the subject matter of claim 2 is allowable over these combinations of references. Thus, claim 1, which recites such subject matter, is also deemed allowable over the Examiner's proposed combinations of Hsieh et al. and Zheng et al., as well as Bicksler et al. and Zheng et al.

As noted above, however, claim 2 was rejected under 35 U.S.C. § 103 as being unpatentable over Yang and Zheng et al. To the extent the Examiner's rejection of claim 2 is pertinent to amended claim 1, Applicant notes that claim 1 has been further amended to recite a portion of the floating gate contacting the inter-electrode insulation film having a length (P), such that  $Q < P < S$  (Q being "a width of the floating gate electrode in the channel length direction ... on a surface of the tunnel insulation film" and S being "a distance between an end portion of one of the gate side-wall insulation films, which end portion is located on a side opposed to the floating gate electrode, and an end portion of the other gate side-wall insulation film, which end portion is located on a side opposed to the floating gate electrode"). Support for such additional language in amended claim 1 can be found, for example, in Fig. 1 and in the specification at page 12, line 12 – page 13, line 13.

As indicated in the marked-up copy of Fig. 3F of Yang reproduced below, the length of a portion of the floating gate 68 contacting inter-poly dielectric 70 ("P") is *greater* than the distance between end portions of sidewall spacer layers 58 ("S"),

apparently by an amount equal to twice the thickness of ASG layer 54 (see Figs. 3B and 3C, layer 54; although present, layer 54 is not labeled in Fig. 3F of Yang).



**FIG. 3F**

Amended claim 1, however, requires that the length (P) of a portion of the floating gate contacting the inter-electrode insulation film be *less* than the “distance [S] between an end portion of one of the gate side-wall insulation films, which end portion is located on a side opposed to the floating gate electrode, and an end portion of the other gate side-wall insulation film, which end portion is located on a side opposed to the floating gate electrode.” Accordingly, Yang at least fails to teach the claimed combination including a floating gate electrode having a length (P) contacting an inter-electrode insulation film such that  $Q < P < S$ , as required by claim 1.

The Examiner relies on Zheng et al. allegedly for teaching a “three-layer structure .. including ... [a] first layer ... [an] intermediate layer ... and [a] second layer.” Office

Action at page 8. However, such disclosure, even if combinable with Yang in the manner proposed by the Examiner, would also fail to teach or suggest the claimed relationship  $Q < P < S$ , as recited in amended claim 1.

Moreover, as shown in Figs. 3C-3E of Yang, spacers 58 are formed *before* floating gate 68, whereas in Zheng et al., spacers are formed *after* the floating gate (see steps S56 and S60 in Fig. 9). Accordingly, Yang and Zheng et al. are not combinable in the manner proposed by the Examiner, and claim 1 is thus not obvious for at least for this additional reason.

In light of above-described deficiencies of Hsieh et al., Zheng et al., Bicksler et al., and Yang, Applicant submits that amended claim 1 is allowable over the applied references and claims 3-7 and 10 are allowable at least due to their dependence from amended claim 1.

Amended claim 20, while of different scope, recites feature similar to those recited in amended claim 1. Amended claim 20, therefore, is allowable at least for reasons discussed above in regard to claim 1.

Applicant respectfully traverses the Examiner's rejection of claims 6-8 under 35 U.S.C. § 103(a) as being unpatentable over Yang in view of Zheng et al., and further in view of Kim et al.; and the rejection of claim 9 under 35 U.S.C. § 103(a) as being unpatentable over Yang in view of Zheng et al., Kim et al., and Bicksler et al. The shortcomings of Yang and Zheng et al. are discussed above, and thus, claims 6-8 are allowable at least due to their dependence from amended claim 1. Regarding claim 9, Bicksler is also deficient, as noted above, and Kim is silent as to subject matter of original claim 2, nor does the Examiner rely on Kim for such teachings. In addition, Kim

is silent as to the claimed relationship  $Q < P < S$ . Accordingly, claim 9 is also allowable at least due to its dependence from amended claim 1.

In view of the foregoing amendments and remarks, Applicant respectfully requests reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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GARRETT & DUNNER, L.L.P.

Dated: September 23, 2005

By: 

David L. Soltz  
Reg. No. 34,731

**Attachments:** Drawing Replacement Sheet (Figs. 7A and 7B)

**AMENDMENTS TO THE DRAWINGS:**

Applicant proposes to amend Figs. 7A and 7B by labeling each of these figures "Prior Art". Applicants proposed drawing changes are indicated in the attached Replacement Drawing sheet.

Attachments: Replacement Sheet (Figs. 7A and 7B)